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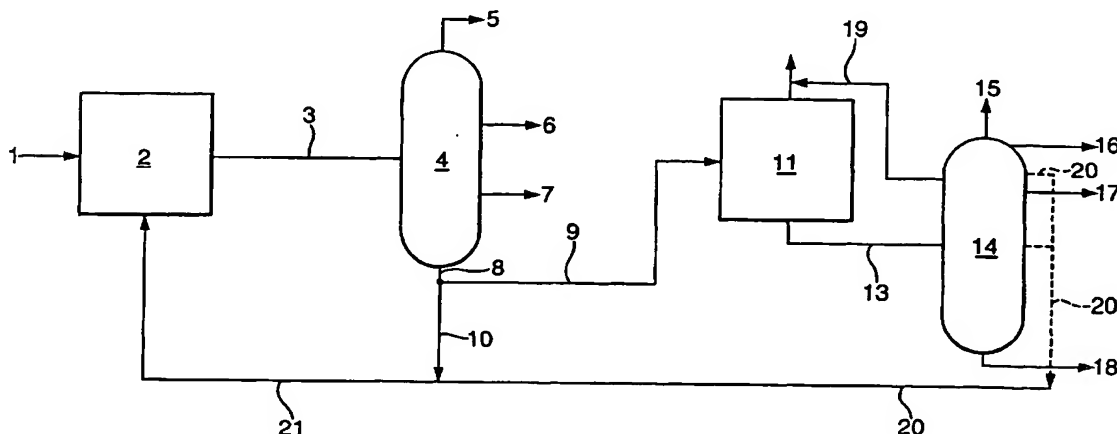
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For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: **PROCESS TO PREPARE A LUBRICATING BASE OIL AND A GAS OIL**



(57) Abstract: Process to prepare two or more lubricating base oil grades and a gas oil by (a) hydrocracking/hydroisomerising a Fischer-Tropsch product, wherein weight ratio of compounds having at least 60 or more carbon atoms and compounds having at least 30 carbon atoms in the Fischer-Tropsch product is at least 0.2 and wherein at least 30 wt% of compounds in the Fischer-Tropsch product have at least 30 carbon atoms, (b) separating the product of step (a) into one or more gas oil fractions and a base oil precursor fraction, (c) performing a pour point reducing step to the base oil precursor fraction obtained in step (b), and (d) separating the effluent of step (c) in two or more base oil grades.

INTERNATIONAL SEARCH REPORT

International Application No

PCT/EP 02/02451

A. CLASSIFICATION OF SUBJECT MATTER
 IPC 7 C10G65/12 C10G65/04

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 C10G

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the International search (name of data base and, where practical, search terms used)

WPI Data, PAJ, EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 00 14184 A (EXXON RESEARCH ENGINEERING CO) 16 March 2000 (2000-03-16) the whole document	1-10
X	US 6 165 949 A (HABEEB JACOB J ET AL) 26 December 2000 (2000-12-26) claim 25	1-10
A	EP 0 776 959 A (SHELL INT RESEARCH) 4 June 1997 (1997-06-04) cited in the application the whole document	1-10
A	US 5 370 818 A (SCHLEIFSTEIN ROBERT A) 6 December 1994 (1994-12-06) claim 1 table 1	11
	-/-	

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

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"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

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"&" document member of the same patent family

Date of the actual completion of the international search

4 November 2002

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INTERNATIONAL SEARCH REPORT

Inter
nal Application No
PCT/EP 02/02451

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 4 582 616 A (KITA TAKEKATSU ET AL) 15 April 1986 (1986-04-15) claims 1-14 tables 1,2	11
A	US 4 299 714 A (SUGIURA KENSUKE ET AL) 10 November 1981 (1981-11-10) claims 1-6 table 2	11

INTERNATIONAL SEARCH REPORT

International application No.
PCT/EP 02/02451

Box I Observations where certain claims were found unsearchable (Continuation of item 1 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☐ Claims Nos.:
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:
3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple inventions in this International application, as follows:

see additional sheet

1. ☒ As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
- ☒ No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. Claims: 1-10

Process for preparing two or more lubricating base oils and a gas oil by hydrocracking/hydroisomerization of a Fischer-Tropsch product, followed by a dewaxing process.

2. Claims: 11-13

A base oil characterized by a kinematic viscosity at 100 C of between 12 and 30 cSt, a viscosity index of greater than 120 and an evaporation loss after one hour at 250 C of at most 0.5 wt% and its use as a plasticiser (claim 12) or as a mould release process oil (claim 13).

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/EP 02/02451

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
WO 0014184	A	16-03-2000	US 6179994 B1	30-01-2001
			AU 752602 B2	26-09-2002
			AU 5693899 A	27-03-2000
			BR 9913412 A	22-05-2001
			CA 2340627 A1	16-03-2000
			EP 1144552 A2	17-10-2001
			JP 2002527530 T	27-08-2002
			NO 20011000 A	04-05-2001
			WO 0014184 A2	16-03-2000
			US 6375830 B1	23-04-2002
US 6165949	A	26-12-2000	AU 5690299 A	27-03-2000
			BR 9913410 A	22-05-2001
			CA 2340087 A1	16-03-2000
			EP 1114132 A2	11-07-2001
			JP 2002524611 T	06-08-2002
			NO 20011123 A	02-05-2001
			US 2002086803 A1	04-07-2002
			WO 0014188 A2	16-03-2000
EP 0776959	A	04-06-1997	EP 0776959 A2	04-06-1997
			AU 705415 B2	20-05-1999
			AU 7198896 A	05-06-1997
			CA 2191290 A1	29-05-1997
			CN 1167811 A ,B	17-12-1997
			JP 9221685 A	26-08-1997
			SG 74001 A1	18-07-2000
			TW 416981 B	01-01-2001
			ZA 9609906 A	28-05-1997
US 5370818	A	06-12-1994	AU 7043994 A	20-12-1994
			WO 9428033 A1	08-12-1994
US 4582616	A	15-04-1986	JP 1537739 C	16-01-1990
			JP 60044593 A	09-03-1985
			JP 63028479 B	08-06-1988
US 4299714	A	10-11-1981	JP 1395235 C	11-08-1987
			JP 56024493 A	09-03-1981
			JP 62001440 B	13-01-1987
			DE 3029830 A1	26-02-1981
			FR 2463181 A1	20-02-1981
			GB 2057494 A ,B	01-04-1981